What is claimed is:

1. A transgenic plant cell transformed by an OBP coding nucleic acid expression vector, wherein expression of said vector in the plant cell results in an alteration in the size of the resulting aerial portion of the plant without dwarfing root tissue as compared to a corresponding wild-type variety of plant.

2. A transgenic plant cell of claim 1, wherein the over-expression of said vector in the plant cell results in a decrease in the size of the resulting plant as compared to a corresponding wild-type variety of plant.

3. The transgenic plant cell of claim 2, wherein the OBP is *Arabidopsis thaliana* OBP3 and orthologs therof.

4. The transgenic plant cell of claim 3, wherein the *Arabidopsis thaliana* OBP3 is SEQ ID NO:1.

5. The transgenic plant cell of claim 4, wherein the OBP3 coding nucleic acid hybridizes under stringent conditions to the sequence as defined in SEQ ID NO:1.

6. The transgenic plant cell of claim 2, wherein the resulting plant is a monocot.

7. The transgenic plant cell of claim 2, wherein the resulting plant is a dicot.

8. The transgenic plant cell of claim 2, wherein the resulting plant is selected from the group consisting of maize, wheat, rye, oat, triticale, rice, barley, soybean, peanut, cotton, rapeseed, canola, manihot, pepper, sunflower, tagetes, solanaceous plants, potato, tobacco, eggplant, tomato, Vicia species, pea, alfalfa, coffee, cacao, tea, Salix species, oil palm, coconut, perennial grass, and forage crops.

9. A transgenic plant comprising a plant cell according to claim 4.

10. A seed produced by a transgenic plant comprising a plant cell according to claim 4, wherein the seed is true breeding for a decrease in the size of a daughter plant as compared to the corresponding wild-type variety of plant.

11. An agricultural product produced by the transgenic plant of claim 9.

12. An agricultural product produced by the transgenic seed of claim 10.

13. A transgenic plant cell transformed by an OBP antisense coding nucleic acid expression vector, wherein expression of said vector in the plant cell results in an increase in the size of the resulting plant as compared to a corresponding wild-type variety of plant.

14. The transgenic plant cell of claim 13, wherein the OBP is *Arabidopsis thaliana* OBP3 and orthologs therof.

15. The transgenic plant cell of claim 14, wherein the OBP3 is SEQ ID NO:1

16. The transgenic plant cell of claim 15, wherein the OBP3 coding nucleic acid hybridizes under stringent conditions to SEQ ID NO:1.

17. The transgenic plant cell of claim 13, wherein the resulting plant is a monocot.

18. The transgenic plant cell of claim 13, wherein the resulting plant is a dicot.

19. The transgenic plant cell of claim 13, wherein the resulting plant is selected from the group consisting of maize, wheat, rye, oat, triticale, rice, barley,

soybean, peanut, cotton, rapeseed, canola, manihot, pepper, sunflower, tagetes, solanaceous plants, potato, tobacco, eggplant, tomato, Vicia species, pea, alfalfa, coffee, cacao, tea, Salix species, oil palm, coconut, perennial grass, and forage crops.

20. A transgenic plant comprising a plant cell according to any one of claim 16.

21. A seed produced by a transgenic plant comprising a plant cell according to claim 16, wherein the seed is true breeding for an increase in the size of a daughter plant as compared to a wild-type variety of plant cell.

22. An agricultural product produced by the transgenic plant of claim 20.

23. An agricultural product produced by the transgenic seed of claim 21.

24. An isolated OBP3 coding nucleic acid comprising SEQ ID NO:1.

25. An isolated OBP3 coding nucleic acid comprising a nucleic acid having at least 60% sequence identity to SEQ ID NO:1.

26. An isolated OBP3 coding nucleic acid comprising a nucleic acid having at least 60% sequence identity to SEQ ID NO:12.

27. An isolated OBP3 coding nucleic acid comprising a nucleic acid having at least 60% sequence identity to SEQ ID NO:13.

28. An isolated OBP3 coding nucleic acid comprising a nucleic acid having at least 60% sequence identity to SEQ ID NO:14.

29. An isolated OBP3 coding nucleic acid comprising a nucleic acid having at least 60% sequence identity to SEQ ID NO:15.

30. A recombinant expression vector comprising any one of the nucleic acids as set forth in claim 24.

31. A recombinant antisense expression vector comprising:

(a) a promoter, said promoter being functional in a plant cell; and

(b) an *Arabidopsis thaliana* OBP3 antisense coding nucleic acid, said promoter being operably linked to said OBP3 antisense coding nucleic acid and said antisense coding nucleic acid oriented with respect to said promoter such that the RNA produced is complementary in nucleotide sequence and capable of hybridizing in a stringent manner to mRNA encoding *Arabidopsis thaliana* OBP3, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:1.

32. The recombinant antisense expression vector of claim 31, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:12.

33. The recombinant antisense expression vector of claim 31, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:13.

34. The recombinant antisense expression vector of claim 31, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:14.

35. The recombinant antisense expression vector of claim 31, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:15.

36. The recombinant antisense expression vector of claim 31, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:16.

37. The recombinant antisense expression vector of claim 31, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:17.

38. The recombinant antisense expression vector of claim 31, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:18.

39. The recombinant antisense expression vector of claim 31, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:19.

40. The recombinant antisense expression vector of claim 31, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides of SEQ ID NO:20.

41. A method for producing a transgenic plant having altered size of the aerial portion of the plant without dwarfing root tissue as compared to the corresponding wild-type plant, said method comprising:

(a) transforming plant cells by introducing a nucleic acid vector encoding *Arabidopsis thaliana* OBP3;

(b) producing plants from said transformed plant cells and

(c) selecting a whole plant exhibiting altered size.

42. A method for producing a transgenic plant having decreased size of the aerial portion of the plant without dwarfing root tissue as compared to the corresponding wild-type plant, said method comprising:

(a) transforming plant cells by introducing the nucleic acid vector as set forth in claim 30;

(b) producing plants from said transformed plant cells and

(c) selecting a whole plant exhibiting decreased size.

43. A method for producing a transgenic plant having increased size as compared to the corresponding wild-type plant, said method comprising:

(a) transforming plant cells by introducing any one of the recombinant antisense expression vectors as set forth in claim 31;

(b) producing plants from said transformed cells and

(c) selecting a whole plant exhibiting increased size.

44. A method for altering the size of the aerial portion of a plant without dwarfing root tissue, said method comprising:

(a) introducing a nucleic acid vector encoding *Arabidopsis thaliana* OBP3 into a plant cell;

(b) regenerating the plant cell into a transgenic plant;

(c) evaluating the change in size by comparing the whole plant obtained by introducing the nucleic acid molecule with the size of a corresponding wild-type plant.

45. A method for altering the size of the aerial portion of a plant without dwarfing root tissue, said method comprising:

(a) introducing any one of the recombinant expression vectors as set forth in claim 30 into a plant cell;

(b) regenerating the plant cell into a transgenic plant;

(c) evaluating the whole plant for a decrease in size by comparing the plant obtained by introducing the nucleic acid molecule with the size of a corresponding wild-type plant.

46. A method for altering the size of the aerial portion of a plant without dwarfing root tissue, said method comprising:

(a) introducing any one of the recombinant antisense expression vectors as set forth in claim 31 into a plant cell;

(b) regenerating the plant cell into a transgenic plant;

(c) evaluating the whole plant for an increase in size by comparing the plant obtained by introducing the nucleic acid molecule with the size of a corresponding wild-type plant.

47. A transgenic plant produced by the methods of claim 42.

48. A method according to claim 42, wherein the plant is a monocot.

49. A method according to claim 42, wherein the plant is a dicot.

50. A method according to claim 42, wherein the plant is selected from the group consisting of maize, wheat, rye, oat, triticale, rice, barley, soybean, peanut, cotton, rapeseed, canola, manihot, pepper, sunflower, tagetes, solanaceous plants, potato, tobacco, eggplant, tomato, Vicia species, pea, alfalfa, coffee, cacao, tea, Salix species, oil palm, coconut, perennial grass, and forage crops.

51. The method of claim 42, wherein the transgenic plant exhibits dwarfism in the aerial tissue as compared to the corresponding wild-type plant.

52. The method of claim 42, wherein the transgenic plant exhibits longer, more robust root growth as compared to the corresponding wild-type plant.

53. The method of claim 43, wherein the transgenic plant exhibits increased aerial tissue growth as compared to the corresponding wild-type plant.

54. The method of claim 41, wherein the vector is introduced into plant cells by a method selected from the group consisting of electroporation, microinjection, protoplast transformation, microprojectile bombardment, liposomal encapsulation, and *Agrobacterium*-mediated transformation.

55. A transgenic plant cell transformed by a nucleic acid sequence encoding an OBP3 polypeptide, wherein expression of said polypeptide in the plant cell results in an alteration in the size of the resulting aerial portion of a plant generated from the cell without dwarfing root tissue as compared to a corresponding wild-type variety of plant.

56. The transgenic plant cell of claim 55, wherein said polypeptide is over-expressed resulting in a decrease in the size of the resulting aerial portion of the plant as compared to a corresponding wild-type variety of plant.

57. The transgenic plant cell of any one of claims 55, wherein the OBP3 is *Arabidopsis thaliana* OBP3 and orthologs thereof.

58. The transgenic plant cell of claim 56, wherein the nucleic acid sequence encoding the polypeptide is selected from the group consisting of:

(a) the nucleotide sequence shown in SEQ ID NO:1, or the complement thereof;

(b) a nucleotide sequence that hybridizes to said nucleotide sequence of (a) under a wash stringency equivalent to 0.1X SSC to 2.0X SSC, 0.1% SDS, at 50-65°C, and which encodes a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 40% or less;

(c) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (a), but which is degenerate in accordance with the degeneracy of the genetic code; and

(d) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (b), but which is degenerate in accordance with the degeneracy of the genetic code.

59. The transgenic plant or plant part of claim 58, wherein the nucleotide sequence in (b) encodes a polypeptide selected from the group consisting of:

(a) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 30% or less;

(b) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 20% or less;

(c) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 10% or less.

60. The transgenic plant cell of claim 58, wherein the resulting plant is a monocot or a dicot.

61. The transgenic plant cell of claim 58, wherein the resulting plant is selected from the group consisting of maize, wheat, rye, oat, triticale, rice, barley, soybean, peanut, cotton, rapeseed, canola, manihot, pepper, sunflower, tagetes, solanaceous plants, potato, tobacco, eggplant, tomato, Vicia species, pea, alfalfa, coffee, cacao, tea, Salix species, oil palm, coconut, perennial grass, and forage crops.

62. A transgenic plant comprising a plant cell according to claim 58.

63. A seed produced by a transgenic plant comprising a plant cell according to claim 62.

64. An agricultural product produced by the transgenic plant of claim 62.

65. An agricultural product produced by the transgenic seed of claim 63.

66. A transgenic plant cell transformed by an antisense nucleic acid sequence complementary to a nucleic acid sequence encoding an OBP3 polypeptide, wherein said antisense nucleic acid sequence results in an increase in the size of a resulting plant as compared to a corresponding wild-type variety of plant.

67. The transgenic plant cell of claim 66, wherein the OBP is *Arabidopsis thaliana* OBP3 and orthologs therof.

68. The transgenic plant cell of claim 66, wherein the nucleic acid sequence encoding the polypeptide is selected from the group consisting of:

(a) the nucleotide sequence shown in SEQ ID NO:1, or the complement thereof;

(b) a nucleotide sequence that hybridizes to said nucleotide sequence of (a) under a wash stringency equivalent to 0.1X SSC to 2.0X SSC, 0.1% SDS, at 50-65°C, and which encodes a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 40% or less;

(c) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (a), but which is degenerate in accordance with the degeneracy of the genetic code; and

(d) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (b), but which is degenerate in accordance with the degeneracy of the genetic code.

69. The transgenic plant or plant part of claim 66, wherein the nucleotide sequence in (b) encodes a polypeptide selected from the group consisting of:

(a) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 30% or less;

(b) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 20% or less;

(c) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 10% or less.

70. A transgenic plant comprising a plant cell according to claim 68.

71. A seed produced by a transgenic plant comprising a plant cell according to claim 70.

72. An agricultural product produced by the transgenic plant of claim 70.

73. An agricultural product produced by the transgenic seed of claim 71.

74. A recombinant antisense expression vector comprising:

(a) a promoter, said promoter being functional in a plant cell; and

(b) an antisense coding nucleic acid sequence complementary to a nucleic acid sequence encoding an OPB3 polypeptide, wherein said antisense nucleic acid sequence is operably linked to said promoter and is oriented with respect to said promoter such that RNA produced by said antisense coding nucleic acid sequence is complementary to and capable of hybridizing in a stringent manner to mRNA encoding OPB3, wherein said OBP3 antisense coding nucleic acid comprises a nucleotide sequence of at least 15 contiguous nucleotides complementary to SEQ ID NO:1.

75. The recombinant antisense expression vector of claim 74, wherein said antisense coding nucleic acid sequence comprises a nucleotide sequence of at least 15 contiguous nucleotides complementary a nucleotide sequence selected from the group consisting of SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:19, and SEQ ID NO:20.

76. The recombinant vector of claim 74, wherein said nucleic acid sequence encoding an OBP3 polypeptide is selected from the group consisting of:

(a) the nucleotide sequence shown in SEQ ID NO:1, or the complement thereof;

(b) a nucleotide sequence that hybridizes to said nucleotide sequence of (a) under a wash stringency equivalent to 0.1X SSC to 2.0X SSC, 0.1% SDS, at 50-65°C, and which encodes a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 40% or less;

(c) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (a), but which is degenerate in accordance with the degeneracy of the genetic code; and

(d) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (b), but which is degenerate in accordance with the degeneracy of the genetic code.

77. The recombinant vector of claim 76, wherein the promoter is an inducible promoter.

78. The recombinant vector of claim 77, further comprising an enhancer element.

79. The recombinant vector of claim 78, wherein the enhancer element is from a CaMV35S promoter.

80. A method of producing a transgenic plant or plant part having an altered aerial portion of the plant without having dwarfed root tissue as compared to a wild type plant, the method comprising:

(a) transforming plant cells with a nucleic acid sequence encoding a polypeptide, said nucleic acid sequence selected from the group consisting of:

(i) the nucleotide sequence shown in SEQ ID NO:1, or the complement thereof;

(ii) a nucleotide sequence that hybridizes to said nucleotide sequence of (i) under a wash stringency equivalent to 0.1X SSC to 2.0X SSC, 0.1% SDS, at 50-65°C, and which encodes a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 40% or less;

(iii) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (i), but which is degenerate in accordance with the degeneracy of the genetic code; and

(iv) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (ii), but which is degenerate in accordance with the degeneracy of the genetic code.

(b) producing plants from said transformed plant cells.

81. A transgenic plant produced by the method of claim 80.

82. The method of claim 80, wherein the transgenic plant exhibits dwarfism in the aerial tissue as compared to a corresponding wild-type plant.

83. The method of claim 80, wherein the transgenic plant exhibits increased aerial tissue growth as compared to a corresponding wild-type plant.

84. The method of claim 80, wherein the nucleic acid sequence encoding a polypeptide is introduced into plant cells by a method selected from the group consisting of electroporation, microinjection, protoplast transformation, microprojectile bombardment, liposomal encapsulation, and *Agrobacterium*-mediated transformation.

85. The method of claim 80, wherein the nucleic acid sequence encoding a polypeptide is contained in a nucleic acid vector.

86. The method of claim 80, wherein the nucleotide sequence in (ii) encodes a polypeptide selected from the group consisting of:

(a) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 30% or less;

(b) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 20% or less;

(c) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 10% or less.

87. A vector comprising a nucleic acid sequence, wherein the nucleic acid sequence encodes an OBP3 polypeptide, said nucleic acid sequence being selected from the group consisting of:

(a) the nucleotide sequence shown in SEQ ID NO:1, or the complement thereof;

(b) a nucleotide sequence that hybridizes to said nucleotide sequence of (a) under a wash stringency equivalent to 0.1X SSC to 2.0X SSC, 0.1% SDS, at 50-65°C, and which encodes a polypeptide having

activity differing from that of *Arabidopsis thaliana* OBP3 by about 40% or less;

(c) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (a), but which is degenerate in accordance with the degeneracy of the genetic code; and

(d) a nucleotide sequence encoding the same amino acid sequence as said nucleotide sequence of (b), but which is degenerate in accordance with the degeneracy of the genetic code.

88. The vector of claim 87, wherein the nucleotide sequence in (b) encodes a polypeptide selected from the group consisting of:

(a) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 30% or less;

(b) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 20% or less;

(c) a polypeptide having activity differing from that of *Arabidopsis thaliana* OBP3 by about 10% or less.